

Application No. 09/901,581
Office Action dated June 30, 2005
Amendment of September 30, 2005

REMARKS

Claims 1-17 were pending in the present application.
Claims 2, 8 and 9 have been withdrawn from active consideration.

The specification has been amended to correct
typographical errors, as suggested by the Examiner.

Claims 5, 11, 13 and 15 have been amended. As regards
the amendments to Claims 11 and 15, support therefor may be
found at page 13, line 30 - page 14, line 1.

Claims 18 and 19 have been added, the recitations for
which having originated in Claim 5 as filed.

Accordingly, upon entry hereof, Claims 1-19 will be
pending.

Affirmation of Election

Applicant affirms the previous telephonic election, as
noted at page 3, paragraph 2 of the Action.

Objection to Specification

Applicant has amended the specification at page 14,
lines 23-24 to delete reference to the CAS number noted by the
Examiner at page 4, paragraph 4.

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Applicant has amended the specification consistent with the Examiner's suggestion at page 4, paragraphs 5 and 6.

As regards the objection at page 4, paragraph 3, Applicant notes that at page 13, lines 16-18, examples of modified amine compound visible for use in the present invention are given somewhat generally. Some specific examples are thereafter given for instance in the paragraph bridging pages 13 and 14. Applicant does not see such description as being inaccurate or requiring amendment. As such, no amendment has been presented herein.

Section 112 Rejections

Claims 5, 11 and 13-15 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite, for the reasons given at pages 5-6 of the Action.

Applicant has amended Claim 5 in line with the Examiner's suggestions at page 5, paragraphs 7, 8 (not Claim 2), 9 (not Claim 2), 10 (not Claim 2) and 12.

Applicant has amended Claims 11 and 15 to remove the objected to tradename and replace language therefor.

As regards the rejection of Claim 14 for use of the term "substantially", Applicant traverses.

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The term "substantially" finds wide usage in patent claims to provide the claim with a degree of breadth that would be inappropriately lost without the use of that term.

As of September 29, 2005, a search of the U.S. Patent and Trademark Office website reveals that from 1976 815,992 patents have issued with at least one claim using the term "substantially". Of that number, this Examiner has passed to issue 95 patents, in his capacity as a primary examiner.

And when the term "substantially insoluble" is searched, the PTO website shows 1429 patents have issued with at least one claim using that term "substantially insoluble", with this Examiner responsible for six of these patents, in his capacity as a primary examiner.

Applicants for Letters Patent of the United States have come to rely on consistency in the examination thereof. Predictability based on past experience is an important element in establishing that consistency. Applicant requests that such consistency be used in the examination of the subject application.

As such, reconsideration and withdrawal of the Section 112 rejection of Claim 14 and the remaining claims rejected thereunder, are requested.

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Section 103(a) Rejections

A. Claims 1 and 3-7 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over International Patent Publication No. WO 99/05196 for the reasons given at page 7, paragraphs 14 and 15 of the Action.

B. Claims 1 and 3-7 stand rejected under Section 103(a) as allegedly being unpatentable over Japanese Patent Document Nos. 11-106480, 10-287809 and 9-52941, U.S. Patent Nos. 6,469,074 (Hino), 6,057,042 (Zhou) and 5,912,316 (Nguyen) in view of U.S. Patent 5,541,283 (Shah); CA abstract no. 1991:610244 of the Modern Paint and Coatings by Dante, CA abstract no. 1991:538279 of the Proceedings of the Water-Borne and Higher-Solids Coatings Symposium by Dante, Japanese Patent Document Nos. 61-84409 and 61-181870, CA abstract no. 1970:404471 of the Plasticke Hmoty a Kaucuk by Fiala and U.S. Patent No. 3,714,112 (Stange), for the reasons given at page 7-9 of the Action.

C. Claims 1 and 3-7 stand rejected under Section 103(a) as allegedly being unpatentable over JP '409 and JP '870, Shah and International Patent Publication No. WO 98/31738 in view of PCT '196 and U.S. Patent No. 5,855,821 (Chau) for the reasons given at page 9-10 of the Action.

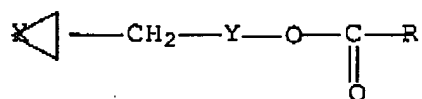
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D. Claims 10-14 stand rejected under Section 103(a) as allegedly being unpatentable over PCT '196, JP '480, Nguyen in view of Shah; the Modern Paint and Coatings article abstract, the Proceedings of the Water-Borne and Higher-Solids Coatings Symposium article abstract, JP '409 and '870, the Plasticke Hmoty a Kaucuk article abstract and Stange for the reasons given at pages 10-11 of the Action.

E. Claims 15-17 stand rejected under Section 103(a) as allegedly being unpatentable over PCT '196 in view of PCT '738 and Shah for the reasons given at page 11-12 of the Action.

Applicant traverses the Section 103(a) rejections.

As the Examiner is aware, the present invention is directed to and claims a thermosetting resin composition. The composition includes an epoxy resin component; a curing agent component; a coreactant, at least a portion of which is represented by the following structure:



where X represents the heteroatoms, oxygen or sulfur; Y may or may not be present, and when present represents alkyl, alkenyl, or aryl; and R represents alkyl, alkenyl, or aryl; and a stabilizer comprising a cyanate ester. Reaction products of this composition are controllably degradable.

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Applicant will address each Section 103 rejection in turn, with a discussion of the documents of record cited in that connection.

Set A Rejection

PCT '196 is directed to and claims a thermosetting resin composition capable of sealing underfilling between a semiconductor device and a circuit board to which the semiconductor device is electrically connected. The composition includes an epoxy resin component; and a latent hardener component, which includes the combination of a cyanate ester component and an imidazole component.

While the subject application is directed to a similar end use, Applicant submits that PCT '196 does not relate to the ability of the composition so described being controllably degradable, thus lending reworkability in the event of failure, say in the microelectronic assembly market place. Instead, the composition described by PCT '196 speaks to achieving certain gel times at a given temperature. To that end, there is no express disclosure, teaching or suggestion in PCT '196 to add a coreactant -- such as the structure set forth in Claim 1 -- to the epoxy-containing composition to achieve such a controlled degradability result.

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As such, Applicant respectfully submits that the Section 103(a) rejection of Claims 1 and 3-7 over PCT '196 is misplaced and thus should be withdrawn.

Set B Rejection

In the next rejection of Claims 1 and 3-7, thirteen separate documents have been used to construct the Section 103 rejection. Applicant discusses each of these thirteen documents in turn and shows how their combination cannot render Claims 1 and 3-7 unpatentable thereover.

Based on an English-language abstract, JP '480 appears to be directed to a composition of 100 to 150 parts of cyanate ester, 100 parts of a liquified epoxy resin, 30 parts of a bisphenol compound, 0.3-2 parts of an imidazole metal complex catalyst, and spherical inorganic filler for use as a liquified impregnation closure underfilling material.

Based on an English-language abstract, JP '809 appears to be directed to a composition having 25-60 parts of a cyanic-acid ester resin, 35-70 parts of a room temperature curable silicone oil having epoxy groups, and a curing catalyst which consists of 0.1-5 parts of a metal chelate or a metal salt.

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Based on an English-language abstract, JP '941 appears to be directed to the combination of a certain epoxy resin and a certain cyanate ester compound.

Hino is directed to and claims a liquid epoxy resin composition for sealing a semiconductor device. The composition is defined to require a cyanic acid ester, an epoxy resin, an inorganic filler, a metal chelate and/or a metal salt, and an acid anhydride. At least one of the cyanic acid ester and epoxy resin is liquid at room temperature, and the acid anhydride is liquid at room temperature. The weight ratio of the inorganic filler to the total weight of the composition is 0.60:1 to 0.95:1, the weight ratio of cyanic acid ester to epoxy resin is 0.76:1 to 1.43:1, and the weight ratio of acid anhydride to the total weight of the composition, except the inorganic filler is 0.01:1 to 0.3:1.

Zhou is directed to and claims a composition defined to require an organic component and a filler, where the organic component contains at least one long-chain cycloaliphatic epoxy resin, at least one short-chain cycloaliphatic epoxy resin, at least one cyanate ester, at least one Lewis acid catalyst, and at least one flexibilizing modifier.

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Nguyen is directed to and claims a resin composition comprising a resin catalyst system including at least one epoxy resin, at least one cyanate ester resin and a catalyst.

Shah is directed to and claims a one pot epoxy resin formulation of a diglycidyl ether of bisphenol A and a latent amine curative having at least 3 epoxy reactive hydrogen atoms, where the curative is incorporated at a level of from about 0.6 to 1.5 equivalents of epoxy reactive hydrogen atoms per equivalent epoxy group in the formulation. Shah's compositions report an improvement for enhancing shelf stability and elasticity of the resulting epoxy resin.

CA abstract '244 of the Modern Paint and Coatings by Dante is directed to glycidyl ester of enodecanoic acid as reactive diluent to reduce the viscosity of epoxy resin formulations and increase their solids content in coating applications. The diluent is reported to offer good viscosity reduction with little diminution of the film properties of the resin system when cured with either a polyamide or modified amine curing agent. The diluent is reported to provide excellent dry time, hardness, and 10% ACOH resistance when cured with a modified amine curing agent.

CA abstract '279 of the Proceedings of the Water-Borne and Higher-Solids Coatings Symposium by Dante is directed to

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glycidyl neodecanoate for use to reduce the viscosity of bisphenol A and F diglycidyl ether polymer coatings while increasing their solids content.

Based on an English-language abstract, JP '409 appears to be directed to a composition having 300-2000 parts of an arborescence metal powder, 100 parts of an epoxy resin, and a curing agent. The epoxy resin is reported to be a bisphenol A diglycidyl ether with at least one sort of monoglycidyl compound chosen from straight chain C₁₁₋₁₃ alkyl monoglycidyl ethers, and straight chain C₉₋₁₁ alkyl monoglycidyl esters.

Based on an English-language abstract, JP '870 appears to be directed to an adhesive or sealant for use on oily steel plates. The adhesive or sealant is said to be based on 100 parts of epoxy resin, 5-40 parts of epoxide reactive diluents, 5-50 parts of nitrile rubber (medium or medium-high nitrile), and 1-20 parts of latent curing agents and accelerators. A suitable composition appears to contain 100 parts of Sumiepoxy ESA-oil, 25 parts of Adeka resin EP4005, 14 parts of Kemgum P-80 (NBR), 8 parts of DP hardener, and 80 parts of crystallite.

Based on an English-language abstract, Fiala appears to be direct to a glycidyl ether and glycidyl benzoate used as reactive solvents for epoxy resins derived from bisphenol A and cured with hexahydrophthalic anhydride in the presence of 2,4,6-

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Lris (dimethylaminoethyl)phenol accelerator. Both solvents are said to become a part of the crosslinked structure after curing. The curing rate measured by the gelation time slightly decreases with increasing concentration of the reactive solvent.

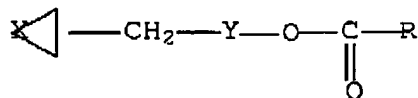
Stange is directed to and claims a fluid resinous composition. The composition includes a 1,2-epoxy resin formed by condensing epichlorohydrin with a compound containing active hydrogen and as a viscosity control agent therefor, 1.0 percent to about 25 percent based on the weight of the resin of glycidyl acetate.

At page 9, paragraph 23 of the Action, the Examiner concludes that based on this collection of documents, it would have been obvious to use glycidyl neodecanoate to impart improved properties "inherent in the particular monoglycidyl ester".

Applicant respectfully points out that it is the combination of:

- (a) an epoxy resin component;
- (b) a curing agent component;
- (c) a coreactant, at least a portion of which

is represented by the following structure:



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where X represents the heteroatoms, oxygen or sulfur; Y may or may not be present, and when present represents alkyl, alkenyl, or aryl; and R represents alkyl, alkenyl, or aryl; and

(d) a stabilizer comprising a cyanate ester, which provides the improved properties, such as controlled degradability.

None of the cited documents of record, individually or collectively, recognize that this combination can yield that desirable physical property.

The Examiner has taken a hindsight approach to the examination of this application, which is evident from the vast number of sources used to attempt to cobble together an obviousness position. Hindsight can find no place in the examination process, which is a well-settled principle.

Despite this cavalier approach, the Examiner has failed to make out a prima facie case of obviousness as that vast number of sources, even if properly combinable (which Applicant disputes), still fails to disclose, teach or suggest the invention as so claimed.

Accordingly, Applicant requests reconsideration and withdrawal of the Section 103 rejections set out in rejection set B, without the use of hindsight in doing so.

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Set C Rejections

JP '409, JP '809 and Shah are discussed above.

PCT '738 is directed to and claims a thermosetting resin composition capable of sealing underfilling between a semiconductor device including a semiconductor chip mounted on a carrier substrate and a circuit board to which the semiconductor device is electrically connected. The composition includes about 100 parts by weight or an epoxy resin, about 3 to about 60 parts by weight of a curing agent, and about 1 to about 90 parts by weight of a plasticizer.

Chau is directed to and claims a composition suitable for use in a semiconductor device assembly. The composition is defined to require a cyanate ester and an epoxy resin component and about 40 to 90 wt.% filler. The cyanate ester is present in an amount of about 10 to 70 wt.%, the epoxy resin is present in an amount of about 30 to 90 wt.%, a curing catalyst is present in an amount of about 0.1 to 1.5 wt.%, and a coupling agent is present in an amount of about 0.1 to 5 wt.%. The epoxy resin is selected from bisphenol A-based epoxy resins, bisphenol E-based epoxy resins, bisphenol F-based epoxy resins, epoxy novalac and biphenyl epoxy. The composition is in the form of a paste at room temperature.

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At page 10, paragraph 27 of the Action, the Examiner concludes that "[i]t would have been obvious to combine the imidazole latent curing agent of Japanese '409 and '870, Shah and PCT '738 with the cyanate esters of PCT '196 and Chau et al. in order to enhance the working life, moisture resistance and curing time."

Applicant submits that the Examiner's determination is of no moment.

As noted above, Applicant has claimed a specific combination of components in order to achieve a composition, whose reaction products are controllable degradable. None of the cited documents of record, whether individually or collectively, disclose, teach or suggest that combination or the specific physical property so achieved.

Accordingly, Applicant requests reconsideration and withdrawal of the Section 103 rejections set out in rejection set C.

Set D Rejections

The documents cited against these claims are described above.

At page 11, paragraph 31 of the Action, the Examiner determines that "[i]t would have been obvious to utilize the

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epoxy-amine addition product of PCT '738 and the Ancamine 2337S of Shah in order to impart repairability, rapid green strength development at low temperatures, excellent shelf stability and high glass transition temperatures for cured products leading to improved strength retention at elevated temperatures."

Once again, Applicant submits that the Examiner's determination is of no moment.

As noted above, Applicant has claimed a specific combination of components in order to achieve a composition, whose reaction products are controllable degradable. None of the cited documents of record, whether individually or collectively, disclose, teach or suggest that combination or the specific physical property so achieved.

Accordingly, Applicant requests reconsideration and withdrawal of the Section 103 rejections set out in rejection set D.

Set E Rejections

The documents cited against these claims are described above.

At page 12, paragraph 34 of the Action, the Examiner determines that "[i]t would have been obvious to employ the epoxy-amine addition product of PCT '738 such as the Ancamine

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2337S of Shah together with the cyanate ester of PCT '196 in order to take advantage of the properties endemic to the epoxy-amine addition product including repairability, rapid green strength development at low temperatures, excellent shelf stability and high glass transition temperatures for cured products leading to improved strength retention at elevated temperatures."

Yet once again, Applicant submits that the Examiner's determination is of no moment.

As noted above, Applicant has claimed a specific combination of components in order to achieve a composition, whose reaction products are controllable degradable. None of the cited documents of record, whether individually or collectively, disclose, teach or suggest that combination or the specific physical property so achieved.

Accordingly, Applicant requests reconsideration and withdrawal of the Section 103 rejections set out in rejection set E.

Miscellaneous

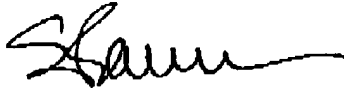
Applicant gratefully acknowledges the indication on the PTO-1449 form that the Examiner has considered most of the documents listed thereon by virtue of his initials appearing in

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the left most column. However, the Examiner has struck through many of the listed citations without leaving his mark, and without giving any apparent explanation therefor. Applicant thus requests that such struck citations be considered and the Examiner so indicate by initialing fresh copies of the PTO-1449 form. Otherwise, Applicant expressly requests the Examiner indicate why his initials have not been left next to the struck citations.

Applicant's undersigned attorney may be reached by telephone at (860) 571-5001, by facsimile at (860) 571-5028 or by e-mail at steve.bauman@us.henkel.com. All correspondence should be directed to the address given below.

Respectfully submitted,



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